THE HISTORY OF SMALLPOX AND ITS PREVENTION IN SWEDEN

Peter Sköld
Associate Professor of History
The Demographic Data Base Umeå University

The demographic transition in Sweden fits well into the models that describe more general West European conditions. This is true for social, political, economic and religious changes, but also for explicit demographic transformations. Mostly because of the unique sources, researchers have most often referred to the population changes in Sweden. Swedish mortality rates start a sharp decline in the early eighteenth century - which apparently was not followed by a corresponding decrease in fertility rates until the end of the century.

FIGURE 1. Crude birth and death rates, Sweden 1750-1950


Six to seven causes of death dominated mortality between 1750 and 1800; with the exception of infirmities of old age and stroke, none had a great impact on mortality fifty years later. Many causes of death were epidemic infectious diseases, such as smallpox, measles, fevers and unknown diseases that can be grouped under the name of epidemic mortality\(^2\).

**FIGURE 2.** Epidemic mortality per 100,000 population, Sweden 1749-1801 and 1851-1950

During the following century, epidemic mortality decreased considerably, so that by mid-twentieth century they represented an insignificant part of total mortality. Other factors that are considered important and general in this context are more positive mortality trends among children and women - also true for Sweden.

---

THE HISTORY OF SMALLPOX AND ITS PREVENTION IN SWEDEN

FIGURE 3. Crude death rates for age-groups 0-19 years, Swedish mortality 1751-1900


FIGURE 4. Age-specific crude death rates (per 100,000), men and women aged 20-44 years, Sweden 1751-1950

During the epidemiologic transition infants and children contributed a successively lower proportion of total mortality, while adults over 60 years contributed a greater proportion. This is logical when we know that life expectancy increased. It is also likely that the important changes in total mortality took place in the younger age-groups. We can see that crude death rates declined continuously between 1750 and 1900 for those under twenty³.

The extensive decline in nineteenth-century mortality has partly epidemiologic and virologic explanations, but the active part played by society has also been important. The enlargement of the health organization and a growing and more competent corps of physicians were also important. However, improvements in sanitation and hygiene, together with public health measures, were as important as the other factors.⁴ Thomas McKeown argued that medicine was not important for the mortality decline until the 1930s⁵, but this has been strongly criticized in recent years.⁶ There is ambivalence how to define the term medicine, but certain difficulties also appear when the relation between public health measures and demographic changes must be estimated⁷. The main problem is that we have to deal with attitudes that are very difficult to measure during the eighteenth- and nineteenth centuries. However, a simple graph giving the number of health related laws and decrees clearly indicates that public health is related to the changing mortality rates. We can see that there is a great increase of laws in the beginning of the nineteenth century. At the same time overall mortality in Sweden decreased sharply.

The epidemiologic transition is a very complex process. It does not follow the same pattern in different places and its chronology also differs. There are great difficulties in discussing the whole problem since so many different factors are involved. One way of dealing with this dilemma is to search for a useful indicator. Certain changes are general and crucial for the proceeding of the transition. When trying to scrutinize the character of the epidemiologic transition, smallpox is a worthwhile case to study.

**INOCULATION AND VACCINATION**

Smallpox was the worst epidemic infectious disease during the eighteenth century. Despite high peaks in smallpox mortality during the worst epidemic years, the disease was endemic in Sweden until the end of the nineteenth century. Between 1750 and 1900 almost 300,000 persons died from the disease. In the beginning of the nineteenth century a sharp decline appears which is maintained and even increased during the period. In the twentieth century smallpox has been a very rare cause of
death and when the WHO declared it eradicated in 1981 it had been absent in Sweden for many years, as in other developed countries$^8$.

**FIGURE 6. Smallpox mortality per 100,000 of population in Sweden 1750-1900 (five year averages)**

[Graph showing smallpox mortality data]


Smallpox was an infectious disease that usually was spread through the respiratory system. After an incubation time of fourteen days rashes appeared in the skin. These developed to blisters and later pocks that were filled with matter. In severe cases the pocks were filled with blood, and these patients never survived the infection. Smallpox was a terrible disease which literally ate its victims$^9$.

---


Cultural variables are not the most important when dealing with smallpox epidemiology. Instead, a regional analysis shows great impact of geographical position and population density. And possibly most important of all communications appears as a factor, especially if analyzed at the local level. In the county of Uppland we can see how the parishes in connection with the country-road system were more severely affected by smallpox mortality.

**Figure 7.** Country roads and smallpox death rates per 100,000 for the parishes of Uppsala country, 1776-1810

Source: Demographic Data Base, Umeå University.

*Fenner et al.* of Infectious Diseases, Third edition (eds. G. L. Mandell, R. G. Douglas Jr. and J. E. Bennett), New York, pp. 1137-38. For detailed descriptions of clinical features of smallpox see *Fenner et al.*, pp. 4-42. A contemporary description of the development of the disease in patients is given by Bergius in 1755.

There were, however, unique possibilities for people to take an active part in the scenario during the eighteenth century. Smallpox was the first—and for a long time the only— infectious disease that humans found a way to protect themselves from in an efficient way, namely inoculation. Although this medical innovation faced great problems all over Europe, it must be understood as a very important public health intervention\textsuperscript{10}.

The people and parishes that first accepted the method can certainly be described as moving parts of a mental and cultural process that seriously marked a break with the fatalism previously so dominating\textsuperscript{11}.

With its roots in eastern folk medicine inoculation had been practised in several places outside Europe for hundreds of years. The principle was to give a slight infection by putting smallpox matter into a scar in the skin but still get a lifelong immunity\textsuperscript{12}. In 1754 the young doctor David Schultz was sent to England in purpose to study inoculation and paediatrics. The Medical Board refused requests to try the method and wanted to wait for the home-coming of dr Schultz. The method of inoculation came to be a weapon in the struggle of positions and influence. The doctors in the Medical Board felt an urgency to do something two years later, in order to forestall the surgeons to pick up the practise. In 1766 the first Inoculation House in Stockholm was opened and pioneer inoculations had been performed in all Swedish district, even of most of them only had made a immunized a few persons\textsuperscript{13}.

Eighteenth-century physicians did not keep records over the inoculated persons. It is therefore difficult to estimate the extent of inoculation in Sweden. However, it is clear that the method never became popular. Nevertheless, some districts were more successful than others. Northern Sweden was closely related to Finland, where inoculation was more widespread. This had a positive impact also on the Swedish side of the boarder. Qualitative sources like the physicians annual reports to the Medical Board are not always reliable. From the district of Gotland, for example, it was reported in the 1760s that inoculation was very successful. In the end of the report, however, the names of the only four immunized children were given.\textsuperscript{14}

\begin{thebibliography}{9}
\bibitem{11} RAZZELL, P. (1977), \textit{The Conquest of Smallpox. The Impact of Inoculation in Eighteenth Century Britain}, Firle.
\bibitem{14} SKÖLD (1996a), pp. 259-88.
\end{thebibliography}
FIGURE 8. Aproximate extent of inoculation in Sweden 1756-1800

If the cut in the skin was made too deep a certain risk of serious smallpox appeared. This was the main reason why the doctors did not want amateurs to inoculate. Another main risk was that immunized persons could infect others who then risked a serious attack. This might even start an epidemic, something the doctors were very afraid of being accused for. Ambivalence was obvious among the doctors, they did not want to lose their positions and take any risks. As a matter of fact several of them express a relief when vaccination was introduced and the old risks eliminated.

It was mostly the physician’s monopoly and an imperfect organization that stopped inoculation from being widely practised. Vaccination —which was introduced into Sweden in 1801— solved these problems by letting the clergy and their assistants convince the public in their parishes that this method was safe and effective. The clergy were also much involved and responsible for the practise of vaccination. Further efficiency was gained when vaccination became compulsory in 1816. Vaccination soon became so popular that regional differences were small. During the first years of practise, however, there is a strong relation between adaptation of this preventive method and the recent experience of smallpox epidemics. The regions with highest smallpox mortality during the last years of the eighteenth century were also the first to accept vaccination.

Vaccination can be interpreted as an expression of parental concern for their children. It is, however, not possible to find any significant relation between low vaccination rates and high infant mortality, many children choked to death or a high proportion illegitimate. But there was a relevant and significant relation between high vaccination rates and the proportion of clergy and their assistants in the different districts. The highest vaccination rates were found in the districts with most clergy, further demonstrating the importance of organization.

---


Source: Sköld 1996b, 256


Source: Sköld 1996b, 255
TABLE 1. Correlation coefficients and p-values for demographic, organizational and be-

havioural variables compared to vaccination in 24 Swedish counties 1816-1820

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhabitants per square mile</td>
<td>0.0337</td>
<td>0.786</td>
</tr>
<tr>
<td>Clergy</td>
<td>0.5454</td>
<td>0.006</td>
</tr>
<tr>
<td>Church assistants</td>
<td>0.4987</td>
<td>0.013</td>
</tr>
<tr>
<td>Physicians and surgeons</td>
<td>0.0493</td>
<td>0.819</td>
</tr>
<tr>
<td>Infant mortality rate</td>
<td>-0.2638</td>
<td>0.213</td>
</tr>
<tr>
<td>Children choked to death</td>
<td>0.2525</td>
<td>0.234</td>
</tr>
<tr>
<td>Illegitimate children</td>
<td>0.1855</td>
<td>0.385</td>
</tr>
<tr>
<td>Deaths from unknown disease</td>
<td>-0.0595</td>
<td>0.782</td>
</tr>
</tbody>
</table>

Source: Population records and mortality records for Sweden 1816-1820. Research ar-

• numbers printed in extra bold type are statistically significant.

Smallpox mortality decreased enormously after the introduction of vaccination in
Sweden. The time-limited effect of vaccination with cowpox was unknown until the
1830s, and this together with problems concerning revaccination affected the age-
distribution of smallpox mortality.

TABLE 2. Smallpox mortality age distribution (per cent), Sweden 1776-1875

<table>
<thead>
<tr>
<th>Year</th>
<th>0 year</th>
<th>1-2 years</th>
<th>3-4 years</th>
<th>5-9 years</th>
<th>10-24 years</th>
<th>25-49 years</th>
<th>50 - years</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1776-1785</td>
<td>25,5</td>
<td>30,9</td>
<td>22,9</td>
<td>14,6</td>
<td>5,8</td>
<td>0,28</td>
<td>0,02</td>
<td>100</td>
</tr>
<tr>
<td>1786-1795</td>
<td>30,1</td>
<td>31,8</td>
<td>18,8</td>
<td>14,3</td>
<td>4,7</td>
<td>0,28</td>
<td>0,02</td>
<td>100</td>
</tr>
<tr>
<td>1796-1805</td>
<td>28,2</td>
<td>33,2</td>
<td>19,7</td>
<td>14,1</td>
<td>4,4</td>
<td>0,34</td>
<td>0,06</td>
<td>100</td>
</tr>
<tr>
<td>1806-1815</td>
<td>28,5</td>
<td>31,2</td>
<td>17,5</td>
<td>15,8</td>
<td>6,2</td>
<td>0,5</td>
<td>0,3</td>
<td>100</td>
</tr>
<tr>
<td>1816-1825</td>
<td>33,4</td>
<td>20,7</td>
<td>9,7</td>
<td>10,9</td>
<td>18,9</td>
<td>6,3</td>
<td>0,1</td>
<td>100</td>
</tr>
<tr>
<td>1826-1835</td>
<td>42,2</td>
<td>17,7</td>
<td>6,4</td>
<td>5,9</td>
<td>12,3</td>
<td>14,8</td>
<td>0,7</td>
<td>100</td>
</tr>
<tr>
<td>1836-1845</td>
<td>37,0</td>
<td>15,1</td>
<td>6,6</td>
<td>8,1</td>
<td>12,7</td>
<td>19,3</td>
<td>1,2</td>
<td>100</td>
</tr>
<tr>
<td>1846-1855</td>
<td>34,8</td>
<td>11,1</td>
<td>4,2</td>
<td>5,8</td>
<td>15,7</td>
<td>25,3</td>
<td>3,1</td>
<td>100</td>
</tr>
<tr>
<td>1856-1865</td>
<td>34,0</td>
<td>9,5</td>
<td>3,5</td>
<td>3,6</td>
<td>12,1</td>
<td>30,9</td>
<td>6,4</td>
<td>100</td>
</tr>
<tr>
<td>1866-1875</td>
<td>31,2</td>
<td>10,1</td>
<td>3,5</td>
<td>4,1</td>
<td>10,6</td>
<td>30,6</td>
<td>9,9</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Pettersson, A. Smittkoppsdödligheten i Sverige under åren 1776-1875. *Hygienisk
Tidskrift* 1912, pp. 11-12.
Smallpox was no longer just a disease of children - during the nineteenth century as many adults died from this disease.

SOCIAL CONSEQUENCES - FERTILITY AND MARRIAGE

Fertility changes have been given many different explanations. Some of these stress cultural differences as important, birth control for example. Smallpox is often claimed to be a factor in male infertility. Razzell has stressed the importance of inoculation in controlling smallpox, thereby giving rise to increased fertility at least amongst the aristocracy\(^\text{18}\). The same has been put forward as a reason for the change in population in the whole of Europe\(^\text{19}\).

I realized that I had a great opportunity to study the impact of smallpox on fertility using the Swedish parish records. Firstly it definitely seemed as there was proof for a significant decrease in fertility among the infected. These women gave birth to an average of 3.86 children while women who never had experienced smallpox gave birth to an average of 6.45 children. This is an extraordinary difference, seldom seen in fertility research. But fortunately I brought marriages into the study.

| TABLE 3. Fertility in Skellefteå by smallpox immunity status, women born 1780-1785 and 1811 |
|-----------------------------------------------|------------------------|------------------------|
| Infected                                     | Vaccinated             |
| Age at marriage                               | 31.5                   | 25.3                   |
| Age at birth of first child                   | 32.9                   | 26.5                   |
| Age at birth of last child                    | 40.1                   | 39.5                   |
| Fertile years within marriage                 | 13.5                   | 19.7                   |
| Fertility rate                                | 3.86                   | 6.45                   |
| Annual average fertility within marriage      | 0.29                   | 0.31                   |


\(^{18}\) RAZZELL, pp. 109-11.

The difference in fertility between infected and non-infected persons can be explained by variation in age at marriage. Women who were previously infected with smallpox had an average marriage age more than six years higher than women who had not experienced smallpox. This - of course - resulted in a shorter period of fertility within marriage for the previously infected women. If the average number of births instead is calculated for each fertile year within marriage the difference between infected and non-infected has disappeared. It is not possible to prove that smallpox infection had a negative impact on fertility. Sterility, however, seems to be one risk for those who survived smallpox. It looks as smallpox infections more than doubled the risk for sterility\(^{20}\).

If we conclude that smallpox was not an important factor for fertility changes —except from sterility— we are nevertheless left with another problem; the difference in age of marriage between infected and non-infected. Why then should previously infected persons have less chance of marriage or at least an early marriage? There is one factor that immediately comes to mind, disfiguring pockmarks. During the 1960s between 65 and 80 per cent of those infected by ordinary-type variola major had facial pockmarks. The number of scars could be between one and several hundred, with most occurring in the face\(^{21}\). Disfiguring pockmarks are perhaps the best known of all smallpox complications\(^{22}\). A smallpox infection brought not only physical but also psychological consequences\(^{23}\). Hopkins tells of a young girl of seventeen years who had her life and beauty ruined by smallpox, her memorial monument stated that she was released by death at the age of 32. In Nepal the King’s Brahman mistress committed suicide because she had lost her beauty after a smallpox infection\(^{24}\). Could it be so that ruined beauty caused social stigmata in the marriage market, and that young people knew this?

«Pockmarked» occurs frequently as a description in eighteenth and nineteenth century literature\(^{25}\). In the novel Gösta Berlings saga by the Nobel Prize winner Selma Lagerlöf ‘the beautiful Marianne Sinclair of Ekeby’ is one of the main characters. She is extremely good looking and suitors were courting her all the time. Marianne eventually decided to marry the young priest Gösta Berling when she was infected by smallpox:

\(^{20}\) SKÖLD (1996a), pp. 200-05.

\(^{21}\) FENNER et al., pp. 49-50. See also SCHULTZ, D. (1756), Berättelse om koppors ympande, öfverlemnad till högloflige Kongl. Sundhets-Commissionen, Stockholm, p. 45.


\(^{24}\) HOPKINS, D. R., p. 75 and p. 150.

The terrible disease had in all its fury attacked her, who had a severe cold and was worn out. Death had come close to her, but at the end of the month she recovered. She was still weak and very disfigured. She should never more be called the beautiful Marianne.

The young woman forbid her servants to tell anyone that she had smallpox and when she had recovered she sent for Gösta Berling. He was filled with strong feelings and on his way to her house he thought of her beauty and of every sentence filled with love he should address to her. The room was darkened when he entered and at first he could not see her, but he recalled from his memory every detail of her face and character.

He fell on his knees at her bed, and took her head in his hands and kissed her, but then he found no words. The heart started to beat furiously, as it wanted to burst his chest. Smallpox had raged her beautiful face. The skin had become rough and filled with scars. Never more should the red blood shimmer on her cheek, or the fine blue veins appear at her temple. The eyes lay fainted under swollen eyelids. The eyebrows were fallen of, and the enamel lustre of the eye was broken with yellow. Everything was destroyed.

This scene could have been taken from real life. When a nephew of the Russian tsarina Elizabeth, later Peter III, was infected by smallpox his fiancée, later Catherine the great, did not see him during his illness. Hopkins writes:

Elizabeth arranged the reunion of the couple in a dim room at the palace in an attempt to soften the impact of Peter's appearance. Unhappy as his childhood had been, Peter's real tragedy probably dated from his smallpox, which eroded his self-confidence by destroying his appearance.

If this assessment is correct, this was one of the most important scarrings in history. The only difference between Lagerlöf’s book and what happened at the Russian court is that Gösta Berling still loved Marianne and married her while Catherine rejected Peter.

Also Lady Mary Wortley Montagu, who introduced inoculation into England, was left disfigured after an attack of smallpox in 1715. She had been greatly admired for her beauty and expressed her anguish in verse. Preserving the beauty of young girls was used as an argument in favour of inoculation. Voltaire told that the Circassians sold young women to Turkey and Persia, but this trade was seriously threatened when smallpox became more common in the country, and beautiful girls died or were disfigured by the disease. At this moment the practise of inoculation started.

---

27 Ibid., p. 126.
28 Hopkins, D. R., p. 58.
30 Voltaire, F. (1745 [1734]), Den Berömde Herr Woltaires eloftes Philosophiske Bref, Om Kopparnes Ympning eller Sättet att uti Barnens yngre år, flytta dem ifrån den ena till den andra, förr än de
In Sweden physicians often mentioned the disfigured faces of the survivors as an argument for public acceptance of inoculation\textsuperscript{31}. In his teachings of the young prince Gustav, later Gustav III, Carl-Gustav Tessin gave arguments for the practise of inoculation. In the third paragraph he wrote: «That never any face will be disfigured, so that no wife has to fear a changed temperament of her husband, or any maid is afflicted by a loss of suitors»\textsuperscript{32}.

Tessin’s letter clearly indicates that pockmarked persons, especially women, were less likely to get married. Also Nils Rosén von Rosenstein stressed that women had better reasons for accepting inoculation, since they risked loosing their beauty, or as Geneviéve Miller puts it, to «turn into unsightly monsters»\textsuperscript{33}.

There was also a greater risk of being unmarried for previously infected persons. This was especially true for women.

<table>
<thead>
<tr>
<th></th>
<th>ATTMAR</th>
<th>NEDERTORNEÅ</th>
<th>SÄTNA</th>
<th>INDAL</th>
<th>TUNA</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infected</td>
<td>14,5</td>
<td>25,4</td>
<td>14,0</td>
<td>10,3</td>
<td>11,0</td>
<td>14,0</td>
</tr>
<tr>
<td>Vaccinated</td>
<td>7,3</td>
<td>10,7</td>
<td>5,7</td>
<td>4,5</td>
<td>16,0</td>
<td>8,3</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infected</td>
<td>10,9</td>
<td>23,8</td>
<td>12,8</td>
<td>6,3</td>
<td>4,8</td>
<td>10,9</td>
</tr>
<tr>
<td>Vaccinated</td>
<td>5,3</td>
<td>9,7</td>
<td>6,0</td>
<td>5,4</td>
<td>13,0</td>
<td>7,4</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infected</td>
<td>17,4</td>
<td>26,8</td>
<td>15,0</td>
<td>14,0</td>
<td>15,8</td>
<td>17,4</td>
</tr>
<tr>
<td>Vaccinated</td>
<td>9,1</td>
<td>11,5</td>
<td>5,5</td>
<td>3,4</td>
<td>18,9</td>
<td>9,2</td>
</tr>
</tbody>
</table>

Source: Demographic Database, Umeå university.


\textsuperscript{32} TESSIN, C.-G. (1756), En gammal mans bref till en ung prints, Latter part, letter no 18, Stockholm, pp. 190-91.

\textsuperscript{33} MILLER (1957), p. 31.
The proportion of unmarried was more than twice as big among women who had experienced a smallpox infection. The disease also had a segregating effect in society, as there is clear evidence that infected persons married each other. It is a striking difference that appears, where we can see that smallpox immunity status was identical for both partners in almost 90 per cent of all marriages.

EPILOGUE: THE ERADICATION OF SMALLPOX

In the end of the nineteenth century smallpox had become a very rare disease. 1895 was the first year when no smallpox deaths were reported in Sweden. This has also been true for the twentieth century. In the 1930s a small epidemic occurred and in 1963 four persons died in what must be expected to have been the last outbreak of smallpox in Sweden. In 1980 the WHO declared that smallpox had been eradicated, but this was stated in journals soon after what proved to be the last infected person, a hospital worker in Somalia in 1977. Nevertheless, it is relevant to ask if it is possible that the disease could return or if any other virus or disease could cause the same damage to the world’s population, as smallpox did over several centuries?

The miasmatic theory of disease emerged into practical vitality in the 1850s, so that filth was recognized as the medium by which contagion was transmitted and not as the source of infection. The conception of contagious elements as a particular living organism clarified the picture. This was done by careful studies by a few epidemiologists and by Pasteur’s development of germ theory. In the 1880s medical authorities throughout the world were primarily concerned with keeping smallpox away from urban areas, where most people lived. In Europe few died from the disease, but epidemics still occurred in cities like Sheffield, London and Liverpool. In 1947 when New York was threatened by a smallpox epidemic chaos nearly ensued and 6,35 million inhabitants were immediately vaccinated. Only twelve persons were eventually infected.

---

38 DIXON, C. W., pp. 308-18.
In 1959, after an initiative from the Soviet Union, the WHO decided to start a global eradication campaign. Ten years later the organizers knew that their goal would be achieved, and their success was not only medical and organizational, but also financial. The total cost of the eradication campaign was 313 million dollars, compared to the 1,000 million dollars that every year had been spent on controlling the disease\textsuperscript{40}. Control measures became effective in reducing further spread of smallpox and in the early 1970s it was stated that the possibility of a large outbreak having imported into the USA or Europe was almost non-existent. Vaccination was no longer carried out on all children, since the risks associated with the method outweighed the threat posed by the disease itself\textsuperscript{41}.

The eradication of smallpox is considered to be a milestone in the history of medicine. Henderson wrote:

\begin{quote}
It will have demonstrated what can be achieved when governments throughout the world join an international organization in a common purpose. In perspective, however, the campaign must be seen as representing only a small first step toward achieving a tolerable level of public health throughout the world\textsuperscript{42}.
\end{quote}

The practise of vaccination finally eradicated smallpox, but we do not have vaccines against all viruses. Even if medicine and technology develops, organizational management improves, and collaboration between states increase we can never be sure that a new virus will not appear, with a similar dreadful capacity as smallpox once showed. Maybe it is the corrective of nature to replace one eradicated disease with a new disease, or maybe it will be possible for us in the future also to control this part of life.

\textbf{Sources and references}

\textit{Unprinted sources}

National archives, Stockholm
Mortality records. The older archive of the Table commission.

Karolinean Institute, Stockholm
Salberg, Johan. Tankar i medicin. Unprinted manuscript 1781, Ms 465. Archive of unprinted sources.


THE HISTORY OF SMALLPOX AND ITS PREVENTION IN SWEDEN

Research archive. Umeå university
Population records and mortality records for Sweden 1816-1820.
CD-ROM «Skellefteåbor under 200 år»

Demographic Database, Umeå University
Data files

Printed sources and references


BERGIUS, P. J. (1755), Försök Til de uti Sverige gångbara sjukdomars utrönande, för år 1754. Til det allmännas tjänst, på Kongl. Collegii Medici anmodan, uppsatt, Stockholm.


Bidrag till Sveriges officiella statistik 1860-1900, Stockholm.


CARTWRIGHT, F. F. (1977), A Social History of Medicine, London.


First Report of the Royal Commission Appointed to inquire into the subject of Vaccination; with Minutes of Evidence and Appendices, London 1889.


Asclepio-Vol. LIV-1-2002 89


Inrikes Tidningar, nº 15, 1765.


THE HISTORY OF SMALLPOX AND ITS PREVENTION IN SWEDEN

SILJESTRÖM, P. A. (1885), En studie i sjukdomsstatistik, Stockholm.
TESSIN, C.-G. (1756), En gammal mans bref till en ung prints, Stockholm.
VOLTAIRE, F. (1745 [1734], Den Berömde Herr Woltaires elofoe Philosophiske Bref, Om Koppor-nes Ympning eller Sättet att uti Barnens yngre år, flytta dem ifrån den ena till den andra, förr än de komma af sig sjelfve, på det att de skola undwika den faran, som dem i äldre åren förestår däraf. Tryckt i Rouan på Fransöska är 1734, Stockholm.